

CLAIMS

What is claimed is:

1. A surgical system comprising a tool for cutting bone or other tissue, an electric motor for driving the tool, and a selectively attachable battery pack, the battery pack comprising an outer housing, an inner housing disposed in the outer housing, at least a portion of the inner housing being formed by a thermal insulative material, and at least one battery disposed in the inner housing.

2. The surgical system of claim 1 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

3. The surgical system of claim 1 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

4. A battery pack for use with an electric-powered surgical instrument, the battery pack comprising a housing, at least a portion of which is formed by a thermal insulative material, and at least one battery disposed in the housing for providing electric power to the surgical instrument.

5. The battery pack of claim 4 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

6. The battery pack of claim 4 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

7. A battery pack for use with a surgical instrument having an electric motor, the battery pack comprising a housing selectively connectable to the surgical instrument, at least one battery disposed in the housing, and a thermal insulative material extending around the battery.

8. The battery pack of claim 7 wherein the thermal insulative material is wrapped around the battery.

9. The battery pack of claim 7 wherein the thermal insulative material is sprayed on the battery

10. The battery pack of claim 7 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

11. The battery pack of claim 7 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

12. A battery pack for use in a surgical instrument, the battery pack comprising a housing, at least one battery disposed in the housing and in electrical communication with the surgical instrument, and a plate or panel disposed between the battery and the housing, at least a portion of

the plate or panel being formed by a thermal insulative material.

13. The battery pack of claim 12 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperatures above its rated temperature.

14. The battery pack of claim 12 wherein the thermal insulative material is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

15. The battery pack of claim 12 wherein thermal insulative material is selected from the group consisting of:

- a. a silica aerogel,
- b. silicone chemical vapor deposition onto the surface of ceramic fabric,
- c. fibers formed by a carbon, or silicon carbide, and oxide and impregnated with ceramic material,
- d. a polyimide foam,
- e. a nanoporous silica coating on a polymer film,
- f. a hydrous calcium,
- g. fused silica, and
- h. a composite of vermiculite, fumed silica, hardening agent, and drawn fiber.

16. A battery pack for selective attachment to a powered surgical instrument, the battery pack comprising a housing comprising two spaced walls forming a vacuum space therebetween, and at least one battery disposed in the housing, the vacuum space thermally insulating the battery.

17. The battery pack of claim 16 wherein the vacuum space is such that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

18. The battery pack of claim 16 wherein the vacuum space is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

19. A battery pack for use with a medical instrument, the battery pack comprising a sealed enclosure placed under a vacuum, and at least one battery disposed in the housing, the vacuum thermally insulating the battery.

20. The battery pack of claim 19 wherein the vacuum is such that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

21. The battery pack of claim 19 wherein the vacuum is such that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

22. A method of manufacturing a battery pack for use with a surgical instrument, the method comprising forming at least a portion of a housing of a thermal insulative material, and disposing at least one battery in the housing.

23. The method of claim 22 further comprising selecting the thermal insulative material so that the life span of the battery is not significantly compromised when exposed to a temperature above its rated temperature.

24. The method of claim 22 further comprising selecting the thermal insulative material so that the life span of the battery is not significantly compromised when exposed to a temperature that is as much as 70 degrees C. above its rated temperature.

25. The method of claim 22 further comprising selecting the thermal insulative material from the group consisting of:

- a. a silica aerogel,
- b. silicone chemical vapor deposition onto the surface of ceramic fabric,
- c. fibers formed by a carbon, or silicon carbide, and oxide and impregnated with ceramic material,
- d. a polyimide foam,
- e. a nanoporous silica coating on a polymer film,
- f. a hydrous calcium,
- g. fused silica, and
- h. a composite of vermiculite, fumed silica, hardening agent, and drawn fiber.